MUNROCHLOA, A NEW GENUS (POACEAE: BAMBUSOIDEAE) WITH A NEW COMBINATION FROM INDIA

Muktesh Kumar and M. Remesh

Forest Ecology and Biodiversity Conservation Division
Kerala Forest Research Institute
Peechi, 680 653, Thrissur, Kerala, INDIA
muktesh@kfri.org

ABSTRACT

Munrochloa (Poaceae: Bambusoideae) a new genus is erected and described here based on a bamboo, which formerly was described under the genus *Oxytenanthera* Munro. A new combination, **Munrochloa ritchiei** (Munro) M. Kumar & Remesh, comb. nov., is proposed.

RESUMEN

Munrochloa (Poaceae: Bambusoideae) se erige como un nuevo género y se describe aquí basado en un bambú, que se describió previamente en el género *Oxytenanthera* Munro. Se propone una nueva combinación, ***Munrochloa ritchiei*** (Munro) M. Kumar & Remesh, comb. nov.

INTRODUCTION

While working on revisionary studies of the genera *Oxytenanthera* Munro, *Pseudoxytenanthera* Soderstr. & Ellis, it was observed that *Pseudoxytenanthera ritchiei* (Munro) Naithani, possessed characters not included in the genus *Pseudoxytenanthera*. Detailed morphological studies revealed that the species possesses a number of unique characters which are very distinct from the generic characters of *Oxytenanthera* and *Pseudoxytenanthera*. Therefore, we are erecting a new genus to accommodate the species.

It was Colonel Munro (1868) who first described the new species in his monograph on *Bambusa*. *Bambusa ritcheyi*, was based on a herbarium specimen collected by J.C. Ritchie from Kala Nuddi, Bombay, India. In the addenda of the same publication, Munro corrected the spelling of the ritcheyi to 'ritchiei' to commemorate Ritchie's name. After a lapse of five years Beddome (1873) collected this bamboo from Anamalai and included it under the genus *Oxytenanthera* Munro. Due to the presence of a monostigmatic ovary, Beddome named this species as *Oxytenanthera monostigma*. This species was subsequently reported by various workers from Western Ghats, hills of south west India from Mahabaleshwar to Anamalai up to Palakkad gap such as Brandis from Sattara Ghats in 1870; R.S. Fagan at Mahabaleshwar in 1892; WA. Talbot from North Canara in 1884 and 1889; R.C. Wroghton, from Pune district and A.D. Wilkins from Ahamed Nagar in 1892 (Gamble 1896). Gamble stated that Munro himself had also agreed with the new treatment as *Oxytenanthera monostigma*. Later, Brandis (1906) and Bourdillon (1908) followed this treatment. Gamble, noted that the species has very well-marked velvety culms, a narrow culm sheath, long narrow spikelets with only one flower, and a glabrous ovary and style. While working on this species at a later day, Gamble commented, "I am rather in doubt whether Munro's specific name should not have precedence". And this doubt was clearly noted by Blatter and McCann (1929) and provided a new combination *Oxytenanthera ritchiei* (Munro) Blatt. & McCann. Without considering the corrected species name as *'ritchiei'*, several workers erroneously spelled the epithet as *ritcheyi* in their publications. Nayar and Ansari (1982) also followed the species name spelling it *ritcheyi*.

While preparing an account of the enumeration of Indian monocotyledons, Majumdar (1989) came to the conclusion that the Indian species of *Oxytenanthera* do not fit the generic description of *Oxytenanthera*. He erected a new genus, *Pseudotenanthera,* to include species having sub-scandent to scandent branches in tufts, no resting central bud, a thin solid style, a pericarp thin and separable from seed, and made a new combination *Pseudotenanthera ritcheyi* (Munro) R. Majumdar.

Subsequently, Naithani (1990) treated *ritcheyi* in the genus *Pseudoxytenanthera* of Soderstrom and Ellis

(1988) to accommodate *Oxytenanthera monadelpha* (Thwaites) Alston which has a vine like culm, numerous basal branches, capitate cluster of spikelets, and six stamens. Naithani (1990) maintained that Majumdar's new genus, *Pseudotenanthera,* coincidentally possesses similar characters of *Pseudoxytenanthera* Soderstr. & Ellis. Therefore, Naithani considered the genus a superfluous name and transferred all the species known of *Oxytenanthera* from India to the genus *Pseudoxytenanthera* Soderstr. & Ellis.

During revisionary studies on Indian Bamboos the authors conducted a detailed comparative account on generic characters of *Oxytenanthera*, *Pseudoxytenanthera* and noted that the *Pseudoxytenanthera ritchiei* (Munro) Naithani, possesses a number of distinct characters such as, completely solid culms, prophyllum buds without keels, inflorescence with strongly capitate heads, with leaf sheaths, palea without keels, and a monostigmatic ovary. The other species treated under the genus *Oxytenanthera* possesses hollow culms, keeled prophyllum of buds, semicapitate heads without leaf sheaths, palea two keeled, and three stigmas. The distinguishing characters of the species also were compared with other genera of the sub tribe Bambusinae such as *Dendrocalamus*, *Bambusa* and *Gigantochloa* It has been noted that the diagnostic characters like solid culms clothed with silky white tomentum; prophyllum buds and palea without keel; monostigmatic ovary, and united filaments, together make this species distinct and therefore, belongs under a new genus *Munrochloa*.

Inter generic affinities

The genus *Munrochloa* shows some affinities with *Dendrocalamus*, *Oxytenanthera, Pseudoxytenanthera* and *Gigantochloa*. (Table 1). The habit and habitats of this taxon resembles *Denrocalamus stocksii* and *Dendrocalamus strictus* both having thick walled culms for those clumps especially growing in dry areas. Though *Munrochloa ritchiei* grows even in fully irrigated areas have fully solid culms. The nature of inflorescence is almost similar to *Dendrocalamus, Oxytenanthera* and *Pseudoxytenanthera* but in *Munrochloa* spikelets clusters are usually supported with leaf sheaths. The spikelets are single flowered. The palea of all the other members in the subtribe Bambusinae is two-keeled. In *Munrochloa* palea is without any keels. The stigma of the species of *Oxytenanthera* and *Pseudoxytenanthera* is divided in to three and *Munrochloa* has a monostigmatic ovary similar to Dendrocalamus and *Gigantochloa*. The inter generic affinity of the *Munrochloa* shows that there is an interlink between *Dendrocalamus* and *Oxytenanthera* and also having distinct generic status with few key characters like, imperfectly keeled prophyllum buds, fully solid culms, palea without any keels.

KEY TO *MUNROCHLOA* AND ALLIED GENERA

1. Bamboo floret with undivided stigma.
   2. Culms fully solid, midculm prophylls and palea not keeled _____ **Munrochloa**
   2. Culms hollow, midculm prophylls and palea keeled.
      3. Inflorescence strongly packed in semiverticellate clusters of spikelets, filaments of the anther free _____ **Dendrocalamus**
      3. Inflorescence loosely packed in semiverticellate clusters of spikelets, filaments of the anther united _____ **Gigantochloa**
1. Bamboo floret with stigma divided into three.
   4. Bamboos erect _____ **Oxytenanthera**
   4. Bamboos scandent or climbing _____ **Pseudoxytenanthera**

Munrochloa M. Kumar & Remesh, gen. nov. TYPUS SPECIES: *Munrochloa ritchiei* (Munro) M. Kumar & Remesh.

Oxytenantherae similes in aspectu et inflorescentiae modo, culmis fere solidis tomento albo-sericeo tectis, prophylli gemmis in culmo mediali imperfecte carinatis, palea ecarinata, ovario monostigmateo differt.

An erect medium sized gregarious, bamboo forming loose clumps. Rhizome is sympodial. Culms are erect and solid. Prophyllum imperfectly keeled. Culm sheaths narrow, conical in shape. Branches are almost equal size. Leaves arise on branches. Inflorescence a large compound spicate, terminal panicle, arises on the nodes of branches as dense globose heads associated with leaf sheaths. Spikelets usually single flowered, sometimes 2, lanceolate, Lemma linear-lanceolate, glabrous. Palea membranous, glabrous, not keeled. Stamens 6,

Table 1. A comparison of Munrochloa with allied genera.

Characters	*Dendrocalamus*	*Gigantochloa*	*Oxytenanthera*	*Pseudoxytenanthera*	*Munrochloa*
Habit	Erect	Erect	Erect	Scandent and semiclimbing	Erect
Rhizomes	Sympodial short necked	Sympodial short necked	Sympodial long or short necked	Sympodial short necked or long necked	Sympodial long necked
Culm	Hollow/Solid	Hollow	Hollow	Hollow	Strictly solid
Culm surface	Smooth and glabrous	Smooth and glabrous	Smooth and glabrous	Smooth and glabrous	Rough and tomentose
Culm sheath auricle	Well developed with or without oral setae	Well developed with or without oral setae	Well developed without oral setae	Well developed with oral setae	Absent or rudimentary without oral setae
Mid culm prophylls	2 keeled	2 keeled	2 keeled	2 keeled	Not keeled
Inflorescence branching and presence of leaf sheath	Strongly capitate and leaf sheath absent	Loosely capitate, few in a head and leaf sheath absent	Strongly capitate and leaf sheath rarely present	Strongly capitate and leaf sheath absent	Strongly capitate and leaf sheaths are prominent
Spikelets	2–3-flowered	2–4-flowered	1–3-flowered	2-flowered	Single flowered
Lemma	Sparsely hairy	Glabrous or sparsely hairy	Sparsely hairy	Sparsely hairy	Glabrous
Palea	2 keeled	2 keeled	2 keeled	2 keeled	Not keeled
Lodicules	Absent	Mostly absent but present in few species	Absent	Absent	Absent
Anther filaments	Free	United	United	United	United
Style	Long and hairy	Long and hairy	Long and hairy	Long and hairy	Long and hairy
Stigma	Single	Single	Three	Three	Single
Fruit	Globose caryopsis	Cylindric or ellipsoid caryopsis	Ellipsoid caryopsis	Ellipsoid caryopsis	Ellipsoid caryopsis

monadelphous, strongly apiculate. Ovary glabrous, ovate; stigma single, curved plumose. Fruit a caryopsis, linear-oblong, faintly grooved with a small beak.

Similar to *Oxytenanthera* Munro in general appearance and inflorescence type but differs in presence of solid culms clothed with silky white tomentum on the surface, imperfectly keeled mid culm prophyll buds, palea without keels and monostigmatic ovary.

Etymology.—The generic name is to commemorate the name of Colonel William Munro (1818–1880), who had contributed the most valuable monograph on Bamboos of the world. This genus is represented only with a single species and endemic to Western Ghats of India.

Munrochloa ritchiei (Munro) M. Kumar & Remesh, comb. nov. (**Fig. 1**). *Bambusa ritchiei* Munro, Trans. Linn. Soc. London 26:157. 1868. *Oxytenanthera ritchiei* (Munro) Blatt. & McCann, J. Bombay Nat. Hist. Soc. 33:773. 1929, "ritcheyi"; V.J. Nair & R. Ansari, J. Econ. Tax. Bot. 3:616. 1982. *Pseudotenanthera ritchiei* (Munro) R.B. Majumdar in Karthikeyan et al., Fl. Ind. ser. 4, 2(Enum. Monocotyl.): 280. 1989. *Pseudoxytenanthera ritcheyi* (Munro) H.B. Naithani, J. Bombay Nat. Hist. Soc. 87:440. 1990; D.N. Tewari, Monogr. Bamboo 127. 1992; K.K. Seethal. & M. Kumar, Bamboos India 225. 1998. *Pseudoxytenanthera ritchiei* (Munro) Ohrnb., Bamboos World 313. 1999, an isonym. TYPE: INDIA: Bombay, Kala Nuddi, *J.C. Ritchie* 820 (LECTOTYPE, here designated: K).

Oxytenanthera monostigma Bedd., Fl. Sylv. S. India 3:233. 1873. Gamble, Ann. Roy. Bot. Gard. Calcutta 7:74, t. 65. 1896 & in Hook. f., Fl. Brit. India 7:402. 1897. Brandis, Indian Trees 674. 1906. Bourd., Forest Trees Travancore 400. 1908. C.E.C. Fisch. in Gamble, Fl. Madras 3:1861. 1934. TYPE: INDIA: Anamalai, *R.H. Beddome s.n.* (HOLOTYPE: K)].

Vernacular names.—Choomaree, chiwa, chiwan, Huda, manga, udhe, thandali (Marathi) Erankol and Korna (Malayalam)

Specimens examined: **INDIA. KARNATAKA:** Uttara Kannda Dist. *s. loc.*, 1884, *WA Talbot 583* (BSI); Feb 1889 *WA Talbot 906* (CAL); Dandeli, 21 Jan 1924, *RN Sarkar 2142* (DD). **KERALA:** Kannur Dist. Panathur, 28 Jan 1979, *VJ Nair 59948* (MH); 28 Jan 1979, Panathady, 28 Jan 1979, *VS* Ramachandran *59291* (MH). Malappuram Dist. Nilambur, 11 Feb1934, *HG Champion 1135* (DD); Manikkamudy, 6 Feb 2001, *M Remesh & N Unnikrishnan 20650* (KFRI); Vazhikkadavau, 7 Aug 1983, *Philip Mathew 34163* (CALI). Palakkad Dist. Manthanpotti, 20 Nov 1999, *M. Kumar & Stephen Sequiera 20635* (KFRI).

Distribution and ecology.—This species is endemic to Western Ghats. It is distributed in northern Kerala and Karnataka. It was also reported from Maharashtra. It is found growing from an altitude of 200–1100 m. It is a component of moist deciduous forests and also found as pure patches. Sporadic flowering is common during summer months. Gregarious flowering was observed in the year 2001 at Nilambur forests, Malappuram district, Kerala.

Conservation status.—This potential bamboo of south India is extracted for various uses. The recent study by the authors revealed that the species is Conservation Dependent as per the IUCN standards and needs appropriate conservation and management strategies for a sustainable utilization of this species.

Uses.—The solid culms of this bamboo are used for making furniture, lathi, etc. It is also used as a support for betal plants, for making baskets, umbrella handles and walking sticks.

ACKNOWLEDGMENTS

The authors wish to acknowledge J.K. Sharma, Director, Kerala Forest Research Institute, Peechi for his keen interest and encouragement and for the facilities. The help rendered by S.A. Renvoize, Herbarium, Royal Botanic garden, Kew for sending the cibachrome sheets of the type specimen deposited in K and the authorities of the Indian Herbaria such as CAL, CALI, DD, BSI, MH, and BLAT for the permission to consult the specimens deposited in the respective herbaria are gratefully acknowledged. The authors express their gratitude to J.F Veldkamp, Nationaal Herbarium, Nederland, Leiden The Netherlands, for providing the Latin diagnoses. The authors are also thankful to the Ministry of Environment and forest, Govt. of India, New Delhi, for the financial support under AICOPTAX Scheme for undertaking this study. We thank Kanchi Gandhi and two anonymous reviewers for their help.

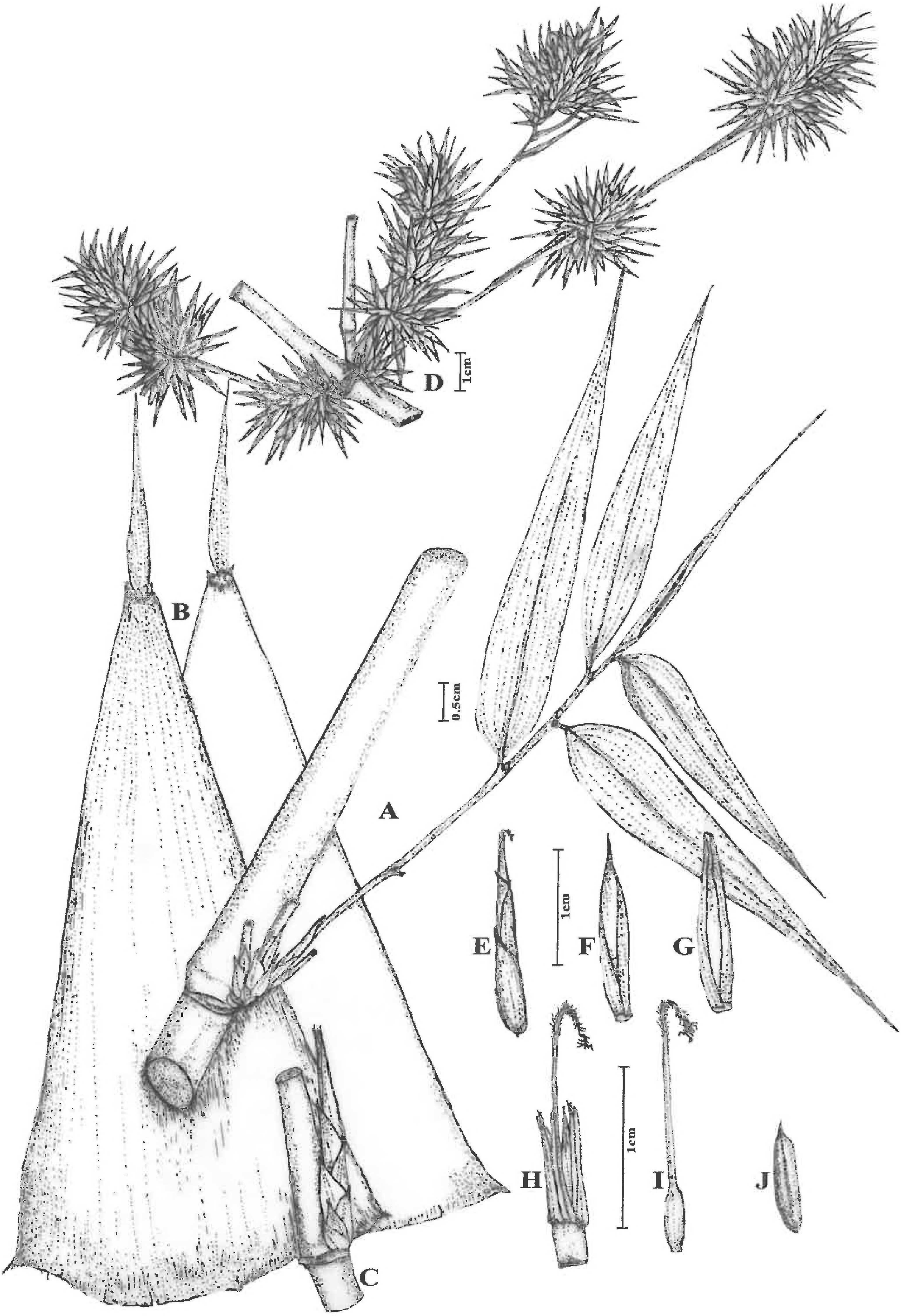

FIG. 1. *Munrochloa ritchiei*. **A.** Solid culm with leafy branches; **B.** Culm sheath dorsal and ventral view; **C.** Nodes with buds; **D.** Inflorescence; **E.** Spikelet; **F.** Lemma; **G.** Palea; **H.** Floret; **I.** Style; **J.** Fruit.

REFERENCES

Beddome, R.H. 1873. The flora Sylvatica for southern India. Madras. 3:232–233.

Blatter E. and McCann. 1929. Gramineae. In: Blatter E. Revision of the flora of the Bombay Presidency Part X. J. Bombay Nat. Hist. Soc. 33:753–775.

Bourdillon, J.F. 1908. The forest trees of Travancore. The Travancore Govt. Press, Trivandrum.

Brandis, D. 1906. Indian trees. Bishen Singh Mahendra Pal Singh, Dehra Dun.

Gamble, J.S. 1896. The Bambuseae of British India. Ann. Royal Bot. Gard., Calcutta 7: 75–76.

Munro, W. 1868. A monograph of Bambuseae. Trans. Linn. Soc. London 26:126–127.

Majumdar, R.B. 1989. In: S. Karthikeyan, et al. Flora Indicae, ser. 4, vol. 1. Enumeratio Monocotyledonae. Botanical Survey of India, Howrah, Calcutta. Pp. 274–283.

Naithani, H.B. 1990. Nomenclature of Indian species of *Oxytenanthera* Munro. J. Bombay Nat. Hist. Soc. 87:439–440.

Nair V.J. and R. Ansari. 1982. Correct name of *Oxytenanthera monostigma* Bedd. (Bambusaceae). J. Econ. Taxon. Bot. 3:616.

Soderstrom T.R. and R.P. Ellis. 1988. The woody bamboos (Poaceae: Bambuseae) of Sri Lanka: A morphological-anatomical study. Smithsonian Institution Press, Washington.